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ABSTRACT

The Trouble-Shooting Checklist (TSC) is an empirically-developed, descriptive instrument which is based on the responses of six educational change agents. It enables an agent to predict a given institution's success in adopting innovations by ordering its levels of concerns and innovation usage. It focuses on two types of innovation: module-adoption and psychological assessment battery combined with a personal counseling orientation. The TSC presents a set of eight information areas within these two courses of events and identifies for each the ideal situation for successful adoption and installation of R&D products, the marginally acceptable and the unacceptable situation. (Author/SM)

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THE "TROUBLE SHOOTING" CHECKLIST: A GUIDE FOR THE EDUCATIONAL CHANGE AGENT

A Paper Presented to the AERA
Annual Meeting, Chicago, Illinois,
April 15-19, 1974

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TM 004 100

The Research and Development Center for Teacher Education was established on the campus of the University of Texas at Austin in 1965, to design, build and test effective products to prepare teachers for careers in the nation's schools.

A staff of more than 100 are engaged in projects ranging from basic research into effective teaching behavior, through development of special counselor training strategies, to the development, implementation and evaluation of a complete and radically different undergraduate teacher education program.

The Center's major program, the Personalized Teacher Education Program, has its roots in teacher personality research dating back to the mid-Fifties. This early research, which demonstrated how teacher's personalities and classroom behavior correlate with success in their teaching careers, has led to the development of a large group of products which help education facilities become aware of student teachers' individual needs. The program also has produced products for student teachers' use, to help them build on their strengths.

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Brad A. Manning

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Typically, it has been difficult to achieve the adoption of innovations in educational institutions. Part of the problem has been caused by the educational change agent's inability to assess an organizational situation quickly and accurately and make informed decisions with respect to commitment of time and resources. Simply stated, he has had his time wasted, through no fault of his own, because predictors of potentially successful adoptors of innovations have been relatively unknown. The "Trouble Shooting" Checklist (TSC) is addressed to this problem.

The "Trouble Shooting" Checklist (TSC) was developed on a project which was responsible for describing case studies of the adoption of the Personalized Teacher Education program (PTE) developed at The Research and Development Center for Teacher Education, The University of Texas at Austin. The TSC was originally designed to identify the variables involved in the adoption of two PTE components: modules and personal assessment feedback.

The design of the TSC may be classified as an innovation specific approach to the study of the adoption-diffusion process, and some explanation of the specific innovations upon which the TSC focuses, is needed. A module is a set of learning experiences which allows a student to move at his own pace towards specific objectives. These objectives, stated in behavioral terms, are accompanied by justifications and procedural instructions. There are usually built-in

activities, such as small group seminars or various field experiences, which are designed to help the student reach his objectives.

Personal Assessment Feedback (PAF) is a system designed to measure and inform teachers of their personal and interpersonal skills. A variety of techniques, such as counseling, film and self-report instruments, are used to help teachers become more aware of their appearance, the effectiveness of their teaching styles, and their interaction skills. As a feedback approach, the PAF allows the teacher to have a greater responsibility and personal involvement in effecting change.

Although the original intention was to provide an empirically based listing of variables which might aid in the description of narrative case history accounts of the adoption process, the TSC gradually developed into an instrument designed to aid the educational change agent in the process of introducing innovations to institutions of higher learning. The TSC provides the educational change agent with information about environmental events, personalities, and organizational structures upon which he must base his decisions and consequent commitment of time and resources. The main objective of the TSC is to assist an educational change agent in predicting his chances of successfully helping an institution adopt an innovation by giving order and predictive meaning to information gathered from otherwise unknown institutional settings. The TSC consists of two distinct psychometric instruments, the TSC-A and the TSC-B. The TSC-A is a predictive instrument to be used in institutions which have adopted or are considering adopting a module. The TSC-B is a predictive instrument to be used in institutions which have adopted or are considering adopting a psychological assessment battery with some form of personal counseling orienta-

tion. For each of these two institutional settings, the TSC identifies the ideal situation for successful adoption and installation of R&D products, the marginally acceptable situation which contains greater risk of success, and the clearly unacceptable situation in which virtually no chance of successful adoption and installation exists.

It should be emphasized that, although these instruments are psychometrically formatted and have empirically based items, norms for their application have not yet been generated. Although these instruments cannot be adequately used until such norms are developed, a logically based scoring system is offered. Plans are now under way for initial norming and validation, and it is hoped that groups of institutions will generate their own norms as well.

The instruments are contained in a manual entitled "The 'Trouble Shooting' Checklist: A Manual to Aid Educational Change Agents in the Prediction of Organizational Change Potential."* The manual includes a selective review of the literature, a description of the development of the instrument, the two "Trouble Shooting" Checklists, guidelines for the change agent, and predictions of event sequences for each of the ideal, marginal, and unacceptable institutions.

After reviewing a selective sampling of the adoption-diffusion literature related to the prediction of institutional change, it seemed possible that the data on institutional variables which had been collected could serve as a basis for the development of a much needed instrument which would be predictive of an

*This manual is available from: The Research and Development Center for Teacher Education, The University of Texas, Austin, Texas 78712. There is a charge of $6.48 since the Research and Development Center does not have funding for dissemination.

institution's potential for successfully adopting an innovation. Hilfiker (1970) summarizes this need:

> Little attention has been given to the social or psychological characteristics of the receiving system (such as a school or school system) and how these characteristics might affect the fate of a given innovation or change...If it becomes possible to consistently diagnose and evaluate the "state" of a school system's organizational climate, it might be feasible to modify the adaptability of professional personnel and to change or create organizational structures and processes which tend to enhance the possibilities of successful institutionalization of innovations. An instrument designed to provide data appropriate to such change processes, with the ultimate objective of modifying the system, might also aid in identifying conditions contributing to excessive change or unstable conditions. An analysis of such conditions might indicate that the system should achieve or return to a state of equilibrium rather than undertake extensive change efforts (p. 27).

Rogers and Shoemaker (1971) also point out the value of being able to estimate change potentials within an organization before deciding on a change strategy. "There is much practical usefulness for change agents if they can identify potential innovators and laggards in their client audience and utilize different change strategies (p. 175)." Before detailing the development of the TSC-A and the TSC-B, a selective literature review relating to the prediction of institutional change will be presented. It is offered as a context from which to view The "Trouble Shooting" Checklist.

Selective Review of the Literature

The first section of the selective review is an introduction and general background. The second section discusses the effects of institutional variables on rates of adoption. The third section describes the use of diagnostic instruments in the study of institutions. The fourth section gives a brief

summary of Bhola's configurational theory. For readers who wish to obtain the TSC manual (mentioned above) the following additional topics are also reviewed: stages of the adoption-diffusion process, the role of communication in the adoption-diffusion process, the role of the change agent in the adoption-diffusion process, and the problem of choosing change strategies for differing types of institutions.

Introduction and General Background Information

Various approaches to the study of innovation have been established. Willower (1970) names three such approaches. The first stresses the content of the curriculum and the preparation of material to correspond with the program objectives of particular fields of study. A second approach, referred to as a "process" approach, considers innovations in terms of the interests and needs of the students, presupposing that learning is increased when students have positive attitudes and high motivational levels. A third approach to the literature on innovation in education is that of "adoption-diffusion." Willower describes this approach as having

> emphasis...on...adoption and diffusion, including such factors as the characteristics of early and late adopting units, the rate of diffusion and distinguishing features of innovations that accompany variations in this rate... [the adoption-diffusion approach]... has its historical roots in rural sociology and the study of new farming practices (p. 388-389).

Eichholz and Rogers (1964), using the "adoption-diffusion" approach to innovation, describe diffusion as the complete process by which an innovation is communicated, disseminated, and finally adopted throughout a user system.

The adoption and diffusion of innovations has typically been a difficult and complex process. The length of time involved from the initial awareness of a need to the final diffusion of an innovation throughout a user system varies from institution to institution. Certain agricultural innovators reported an average time lag of 1.54 years between the time of awareness and adoption (Beal, Rogers, & Bohlen, 1957). Studies of other technological innovations suggest that five to ten years is a typical time lag (Voegel, 1971). As Mort (1964) states in reference to educational innovations:

> The early studies indicated that change...comes about through a surprisingly slow process and follows a predictable pattern. Between insight into a need...and the introduction of a way of meeting the need...there is typically a lapse of a half-century. Another half-century is required for the diffusion of the adaptation. During that half-century of diffusion, the practice is not recognized until it has appeared in 3% of the systems of the country. By that time, fifteen years of diffusion--or independent innovation--have elapsed. Thereafter, there is a rapid twenty years of diffusion, accompanied by much fanfare, and then a long period of slow diffusion through the last small percentage of school systems (p. 318).

This tremendous time lag, together with reports from the U. S. Department of Commerce that up to 90% of all innovations fail within four years after being introduced (Rogers & Shoemaker, 1971), indicates the size of the problem faced in implementing innovations in our educational system. In order for our educational system to keep pace with our rapidly changing society, more expedient methods of integrating innovations into organizations are being developed. One such method involves the use of a versatilely trained social science professional in the role of a change agent. Such research-based agents are proving to be a crucial link between information centers and the classroom (Cooke & Zaltman, 1972; Kerins et al., 1971; Richburg, 1970; Voegel, 1971). The change agent fills this

role "as a learning system expert in cooperating with the faculty to design, implement and evaluate new instructional strategies and approaches (Voegel, 1971, p. 69)." The change agent must be able to translate a conceptual model into a learning or instructional model, which he then introduces and helps to integrate into an organization. This requires not only an understanding of the innovation, but also knowledge of the facilities, location, aid, information resources, staff, and materials of the institution (Voegel, 1971). The strategy for introducing and presenting the innovation would depend on these variables. The change agent also must be able to use behavioral science techniques at specific intervention points (Beckhard, 1969) which vary from institution to institution and with particular innovations (Rogers & Shoemaker, 1971; Stuart-Kotzé, 1972). The job of the change agent then, is nothing less than "that of harnessing the bureaucracy, of creating structures designed to nurture a genuine concord of values, goals, and action (Willower, 1970, p. 390)." In other words, he guides the adoption-diffusion process.

The two main approaches to the study of the effects of variables in the adoption-diffusion process appear to focus on: characteristics of innovations, and characteristics of the adopting organization. Rogers and Shoemaker (1971) examine both approaches. In their discussion of characteristics of innovations, the emphasis is on how the perception of the innovation by the adopting institution affects its rate of adoption. Characteristics of the innovation which they discuss are: its relative advantage to the institution; its compatibility; its lack of complexity; the ease with which it can be demonstrated; and, its observability.

Investigators (Bhola, 1972; Rogers & Shoemaker, 1971) have also focused on institutional variables and how they affect the adoption process. This review of the literature and subsequent development of the TSC is concerned with this latter approach.

The Effects of Institutional Variables on Rates of Adoption

Rates of adoption have been used by investigators as the basis for categorizing institutions. Studies indicate that adoption rates can be graphically illustrated by an S-shaped curve (Alba, 1969; Beal et al., 1957; Carlson, 1964; Mort, 1964; Rogers & Shoemaker, 1971).

> The S-shaped adopter distribution rises slowly at first when there are few adopters in a time period. Then it accelerates to a maximum when half of the individuals in the system have adopted. It then increases at a gradually slower rate as the few remaining individuals finally adopt (Rogers & Shoemaker, 1971, p. 178).

The S-shaped curve is explained in part by learning curves (Beal et al. 1957; Rogers & Shoemaker, 1971) and in part by the "diffusion effect" (Rogers & Shoemaker, 1971). The diffusion effect is defined as

> ...the cumulatively increasing degree of influence upon an individual to adopt or reject an innovation, resulting from the increasing rate of knowledge and adoption or rejection of the innovation in the social system (p. 161).

On the basis of the S-shaped and the related bell-shaped curves of adoption-diffusion, Rogers and Shoemaker (1971) classify and describe institutions by the following categories: innovative, early adopters, early majority, late

majority and laggards. In another study, Smith (1970) developed a grid identifying four types of institutions on the basis of two institutional variables. One variable is the degree of change sought and the other is the level of involvement of members of the organization. When both the level of change sought and degree of involvement are high, then the institution is described as ideal for innovation. When they are both low, the institution is likely to be unsuccessful in adopting an innovation. When the institution has high involvement and low change or high change and low involvement, then chances are moderate that the innovation will be successful.

Although the literature contains descriptive models of institutions based on rates of adoption, systematic categorizations of organizational variables which would affect the adoption-diffusion process have not been found. Because of the need to consolidate a vast array of organizational variables from many studies, the following categories will be used: 1) organizational structure; 2) personality and leadership styles of organization members; 3) communications; 4) level of usage; and, 5) characteristics of students within the institution. These categories will be examined within the contexts of ideal, marginal and unacceptable institutional settings. Since the literature has indicated that there are many similarities between agricultural variables and educational variables which affect the adoption-diffusion process, some of the findings included in this section are derived from agricultural settings.

Ideal Institutions for Successful Adoption of Innovations

Organizational structure. One measure of an institution suggested by McGrath (in Bolman, 1970) is the degree of "democratic governance." "Democratic

governance has to do with the extent to which individuals in the campus community who are directly affected by a decision have the opportunity to participate in making the decision (p. 595)."

Hilfiker (1970), in a study conducted to determine what independent variables were related to successful innovation in school systems, collected empirical support to illustrate the importance of democratic governance. The following variables were found to be statistically significant at the .05 probability level: social support provided by administrative personnel as perceived by professional personnel; satisfaction with the quality of problem solving and the amount of time spent on it during staff meetings; the degree of powerlessness felt during faculty and administrative council meetings; and the degree of openness and trust felt within the organization. "Openness" is a key word repeatedly used to describe the ideal institutional climate (Hearn, 1970; Hilfiker, 1970; Smith, 1970). However, Maguire (1970) points out that conflicts might be expected when structured change is introduced in such an "open," democratic institution.

Institutional mechanisms must be present which encourage and facilitate change: 1) time and resources must be made available; 2) freedom to try innovations without fear of penalty for failure must be guaranteed by the organization; 3) there should be rewards for the successful adoption of innovations; and, 4) control of substantial financial resources may be necessary to absorb the costs of possible failures (Smith, 1970). It has been found that the most successful innovation adopting institutions have higher expenditures per pupil, more local commitment of funds, and higher family incomes (Bigelow, 1947; Hearn, 1970; Ross, 1958).

In general, the successfully adopting institution is larger in size (Hearn, 1970; Rogers, 1962) and has more active participation from all members of the organization (Hearn, 1970).

Personality and leadership styles of organization members. The literature indicates that administrative support is needed to create an institutional climate receptive to and actively encouraging innovation (Brightman, 1971; Crandall, 1972; Feitler & Blumberg, 1972; Smith, 1970). In general, innovative administrators are described as more cosmopolitan than non-innovators (Rogers & Shoemaker, 1971; Ryan and Gross, 1943; Wolf & Fiorino, 1972). They are likely to have been born in rural environments, to have moved more often and have attended more out-of-state meetings than non-innovators (Hearn, 1970). It has been determined that those administrators who are better educated (Carlson, 1964; Hearn, 1970), have had more experience as administrators (Hearn, 1970), and have the highest level of interaction and involvement (Carlson, 1964) are the most innovative. Innovative institutions also have more opinion leadership than non-innovative institutions (Rogers & Shoemaker, 1971); and, while age isn't necessarily an important variable, younger administrators are often more innovative (Hearn, 1970).

Innovators have a willingness (Feitler & Blumberg, 1972) and even an eagerness to try new ideas (Rogers & Shoemaker, 1971). They often exist as a clique of friends who communicate closely even when geographically distant (Rogers & Shoemaker, 1971).

Communications. Information on the nature of communications between change agents and client institutions is limited, but there are indications that communications occur more frequently with earlier adopters than later adopters (Rogers

& Shoemaker, 1971). Institutions which have better internal communication systems also have a greater diffusion effect and therefore a faster diffusion rate (Rogers & Shoemaker, 1971).

Levels of usage. The greater the number of innovations tried in the past, the greater the chances of adoption of the new product (Hearn, 1970). Based on the S-shaped curve of rates of diffusion, ideal institutions adopt innovations at a very high level early in the adoption-diffusion process.

Characteristics of students. Students of innovative institutions are primarily from higher income families (Bigelow, 1947; Hearn, 1970; Ross, 1958). They are able to make contributions to the organizational whole and their ideas and suggestions are heard (Hearn, 1970). They perceive their institution as an "ideal" learning situation (Crandall, 1972).

Marginally Acceptable Institution for Successful Adoption of Innovations

Since the largest number of institutions will fall under this category and because many of these institutions will have varying rates of adoption-diffusion, it is not likely that any one institution will have all of the following characteristics in the same degree. The more the statements characterize the institutional variables of a given setting, the greater the chances for a speedier adoption; and, conversely, the less the statements characterize institutional variables, the less likely will be the chances for a successful and speedy adoption.

Organizational structure. There is, unfortunately, much more information

on personal characteristics of adopters than on organizational variables (Hilfiker, 1970; Rogers & Shoemaker, 1971; Willower, 1970). The marginally acceptable institution is described as having a "well-integrated" system. The more innovative the institution, the more modern will be its institutional norms; the less innovative, the more traditional the norms. Later adopters in this category are likely to adopt only because of economic necessity or increasing social pressure (Rogers & Shoemaker, 1971).

Personality and leadership styles of organization members. The more innovative the institution, the more opinion leaders there will be. The leaders will be better educated, have higher social status, greater upward social mobility, will be members of larger organizations, and will be more favorable towards change, education and science. They will be less fatalistic, have higher levels of achievement motivation, higher aspirations, will be more cosmopolitan, and will have greater exposure to mass media and interpersonal communication channels (Rogers & Shoemaker, 1971).

Communications. The more innovative the institution, the more contacts there will be between the institution and the change agent (Rogers & Shoemaker, 1971).

Level of usage. Based on the S-shaped curve of rates of diffusion, some of the marginal institutions will adopt fairly early (13.5%), most will adopt after the initial adoption by other (34%), and a large number will adopt after the majority (34%) (Rogers & Shoemaker, 1971). The level of usage of innovations thus increases by large percentages among the institutions within this category.

Characteristics of students. No information relating directly to student populations of these institutions was found. However, after examining descriptions of more innovative institutions and less innovative institutions, it can be reasonably expected that the students would come from the range of middle to lower-upper income families, and may or may not have some voice in decision-making.

Unacceptable Institutions for Successful Adoption of Innovations

Organizational Structure. Derr (1970) outlines in detail an organizational situation in which innovation efforts failed. Departmental organization is described as "uncoordinated" with very little sharing of information. The change group had to agree to confidentiality from the beginning, which greatly hindered the team's ability to share information. Shared decision-making was non-existent and there were many dysfunctional power struggles within the organization. Directives from high administrators were consistently ignored. Pronounced status and pay differentiation existed between department heads. Power within the organization was dependent on patronage, informal contacts, and social contacts. In some instances kinship ties were a factor. Partly as a result of such administrative practices and policies, there was a pervasive sense of alienation and defeat. Members of the organization hardly knew one another and many met for the first time during the project workshops. This situation is exemplary of Maguire's (1970) comments on administrative patterns which remain constant while educational processes are changing.

Personality and leadership styles of organization members. Among the laggards there are virtually no opinion leaders (Rogers & Shoemaker, 1971). Administrators are suspicious of collaboration (Derr, 1970) and of innovations, innovators and change agents as well (Rogers & Shoemaker, 1971). In general, they are described as localized in their outlooks, nearly isolated, and focused on the past (Rogers & Shoemaker, 1971). Eichholz and Rogers (1964) describe them as being ignorant of innovations or having no interest in change. They are supporters of the status quo and societal mores. Often, they had previously participated in an unsuccessful innovation. They are described as very dependent on peer opinions and tending to adopt only when peer pressure favors adoption and the status quo permits it.

Communications. In the study which Derr (1970) cites, there was a two month period of deliberation before the first exploratory meetings took place. Communication and collaboration between the change group and the administrators remained very poor throughout. Attempts at collaboration were often turned down because the administration considered it too time consuming and unnecessary. Requests for distribution of information and reports were neglected. Administrators miscommunicated information from the change group to the staff. In general, information exchanged between the two groups was of poor quality. The real needs and intentions of the two groups (the institution and the change group) were not well communicated or accepted by the other. "Lack of open disclosure about the needs of the two groups resulted in a client-consultant power struggle where each side spent a good deal of time trying to second guess the motives and next moves of the other side (p. 412)." The institution was not really interested in innovation, but rather, wanted the report from the change group in order to bargain

for more funding and staffing. Perhaps this hazard is not uncommon to change agents. In a study by Yates (1971) it was determined that there were no significant differences in the perception of new state plans for special education between those who had adopted the innovation and those who had not. The only apparent differences between the two were increased funding and staffing for the "innovative" school systems. Beyond the increased funding and staffing, there was no interest in innovation. In an unacceptable institution, the real needs and intentions of an institution are often not communicated to the change agent.

Level of usage. If there has been previous usage of innovations, they have most likely been unsuccessful attempts (Eichholz & Rogers, 1964). If these institutions adopt at all, it will be very late compared to other institutions. Even more likely, however, is that this group will not adopt at all or will adopt only some aspects of a program under peer pressure.

Characteristics of students. Since there is no free communication within the organization or shared decision-making (Derr, 1970), it can be reasonably expected that the students' ideas will not be considered. There will be a sense of powerlessness among most members of the organization (Derr, 1970).

Diagnostic Techniques

Survey feedback and interview techniques seem to be the only explicit techniques used by change agents to obtain information on organizational variables. There are many accounts of the use of such techniques in business and industrial settings (Bennis, 1966; Lorsch & Lawrence, 1969; Miles, Hornstein, Callahan,

Calder, & Schiavo, 1969).

> Survey feedback is a process in which outside staff and members of the organization collaboratively gather, analyze and interpret data that deal with various aspects of the organization's functioning and its members' work lives, and using the data as a base begin to correctively alter the organizational structure and the members' work relationships (Miles et al., 1969, p. 458).

Data collected is then "fed back" to the subjects from whom it is collected. In such a way, the clients themselves become involved in the analysis process. This "feedback" usually takes place in one of two ways: through top management who make the diagnosis; and, through the change agent who presents a diagnosis (Lorsch & Lawrence, 1969). As Lorsch and Lawrence explain, there are difficulties with this method, in that high level management personnel are often unable to see the full scope of problems from their vantage point, and change agents are not always able to effectively communicate their diagnoses to the management. A third problem which Lorsch and Lawrence mention is that the action is often planned in advance of the actual diagnosis, in which case, the diagnosis becomes a useless exercise or even a stalling technique. Perhaps one of the problems is that of the manner in which the diagnostic instruments are used. Havelock (1971) notes the problems that may result from either omission of, or "obsession" with the diagnostic stage. When adequate diagnosis is omitted, solutions may be invalid or harmful (Watson, 1966); over-emphasis on diagnosis may reduce the chances that a solution will be sought (Havelock, 1971). However, all the authors point out that such survey techniques can be effective. Lorsch and Lawrence (1969) state that change strategies aimed at problem areas can be effectively developed on the basis of such feedback. In addition, personnel can be directly involved in the change process by offering opinions and suggestions on the survey as well

as in later "feedback analysis" groups.

Similar diagnostic survey approaches, designed to be used in educational settings, are described by Havelock (1970). Havelock states that the diagnostic approach results in ". . . a description of the client's problem which includes the essential details of symptoms, history, and possible causes (p. 59)." Included in this document are a series of questions aimed at uncovering problem areas within the educational institution. Many of the potential problem areas which he includes are similar to those included in the TSC. However, there are distinct differences between Havelock's diagnostic approach and the TSC.

First of all, the TSC is innovation-specific. Organizational strengths and weaknesses are considered from the perspective of how they would affect the adoption of a particular innovation in a particular institution. Generally, an instrument designed for diagnostic purposes is used to identify the problem areas in an organization in order to determine what changes should be made. The TSC might be useful for this purpose in that it does identify organizational variables within an educational setting, but clearly that is not its sole purpose or aim.

Secondly, the TSC is predictive in nature. The results of the checklist are intended to aid a change agent in deciding whether or not an institution is suited for a particular innovation. The TSC is not specifically designed for diagnostic purposes, since it might be possible for an institution to successfully adopt and diffuse a particular innovation without changing "trouble spots" within the organization. The "trouble spots" are indicated as a caution to change agents

in working with an institution.

Finally, while survey instruments are designed to be distributed to a number of personnel within the organization, the TSC is to be completed by the change agent himself, although it might be helpful for the change agent to use survey techniques in collecting data for the TSC.

Bhola's Configurational Theory of Innovation Diffusion

Another important approach to the study of institutional variables and how they affect the success of an innovation is Bhola's (1972) "configurational theory." As he describes his theory, it

> is designed basically to explain the process of innovation diffusion and predict in probable terms success or failure of innovation diffusion plans and projects. It focuses on the diffusion event and its practical concerns lie in increasing the probability of occurrence of such events (I, p. 12-13).

According to Bhola, successful diffusion of an innovation depends on four variables: configurational relationships (social units), linkages (communication patterns), the environment and available resources. Each of these variables, in relation to each other and to the innovation, affects the success of the adoption process. Bhola suggests a system of charting these variables in relation to each other so that it is possible for a change agent or change target to predict potential success and plot strategies for change. The theory is very well-developed and inclusive and, as Havelock (1971) points out, "is a most significant step toward a general science and an engineering science of D & U (Dissemination and Utilization) Process (p. 11-10)."

Configurations, or social units, are considered in terms of the individuals, groups, the institution, and the general culture. The adopter system is the "Target Configuration." "Configuration plotting" or "mapping" is described as

> the process of identifying the configurations . . .within or without the boundaries of the configurations directly involved as innovator(s) in a change episode; and of presenting, graphically, their relationships in terms of structural bonds, locations in systemic space, hierarchy, and mutual expectations of influence and compliance established by custom, tradition or law (II, p. 4).

Such mapping depends on both empirical knowledge and speculation. "Linkages" represent communication patterns between two configurations, which may be linked directly or indirectly (through a third party). "Linkage typing" is described as a system of graphically illustrating various types of linkages. Symbolically, Bhola represents his theory in the following equation:

$$D=f(C,L,E,R)$$

Or, spelled out,

> Diffusion (D) is a function of the configurational relationship (C) between the initiator (i) from a class of such initiators and the target (j) from a class of such targets; the extent and nature of the linkage (L) between and within configurations; the environment (E) in which the configurations are located; and the resources (R) of both the initiator and target configurations (II, p. 8-9).

The TSC, in essence, is designed to be a quick screening device; whereas, Bhola's configurational theory of innovation diffusion makes it possible to study all aspects of an organization in depth and in relation to each other. However, since the TSC identifies and describes many of the same organizational characteristics as Bhola's configurational theory, the configurational theory

may offer a validity check for independently developed instruments such as the TSC. If a theory as sophisticated and comprehensive as Bhola's produces predictions similar to those of the TSC, this would lend great support to the TSC.

Theoretical Framework of the "Trouble Shooting" Checklist

The TSC is related to the Concerns Based Adoption Model (Hall, Wallace & Dossett, 1973) presently under investigation at the Research and Development Center for Teacher Education. This model describes the effects of stages of human concern in interaction with levels of use of an innovation within an educational institution. The CBAM (Concerns Based Adoption Model) draws upon Fuller's (1969) paper on concerns of teachers and describes many of the attitudes and dynamics of innovation-adopting members of an institution. Typically, teachers facing a new situation (or new innovation) will first be worried about their abilities to cope with the situation (self concerns). After such concerns are resolved they will focus on how to use the innovation in the classroom (task concerns). Finally, they will ask themselves how the innovation can be used to help their students and fellow faculty members (impact concerns). The CBAM also assumes that an institution will use an innovation differently the second and third time it is tried. Under normal conditions, with reasonable access to resources, an institution's members will gradually change their concerns from self concerns to impact concerns and consequently increase their level of usage. The level of usage of an innovation will typically begin with an orienta-

tion stage in which members of an institution go through an initial adjustment. Intermediate stages are centered around training and practice. Final stages focus on the integration of the innovation into an entire institutional program. At this point, a renewal stage is possible insofar as institution members are able to build effectively upon a successfully adopted innovation.

The TSC is based on the assumption that, in order for these stages of concern and levels of use of an innovation to develop to a sophisticated degree, certain conditions must be met. The TSC attempts to identify these conditions within five basic dimensions, each of which has several sub-divisions. The first dimension is Organization Structure and is divided into the following subdivisions: organization structure; social-professional climate of the organization; characteristics of the faculty; and, characteristics of the administration (for the TSC-B, characteristics of the counselor are also included). The second dimension is Personality and Leadership Styles and is divided into the following subdivisions: personality and leadership styles of the faculty; personality and leadership style of the department chairman; and, personality and leadership style of the dean (fo the TSC-B, personality and leadership styles of the counselor are also included). The third dimension is Nature and Type of Communications Used and is divided into the following subdivisions: general nature of all communications used; frequency and nature of letters and phone calls; and, frequency and nature of personal visits. The fourth dimension is Level of Usage of Modules and Other Instruments and is divided into the following subdivisions: first stages of adoption; prediction of later stages of

adoption; and, organization members' attitudes toward the innovation. The fifth dimension is Description of Prospective Teachers and is divided into the following subdivisions: personality and social characteristics of prospective teachers; academic style of prospective teachers; and, characteristics of faculty which affect prospective teachers. The above five dimensions with their corresponding subdivisions are also the names of the major scales and corresponding subscales in the TSC-A and the TSC-B.

Methods and Techniques

The TSC was first developed as a survey form (TSQ - "Trouble Shooting" Questionnaire), which was used to collect the information upon which the present TSC is based. The TSQ was a twenty-nine page questionnaire which presented eight question areas in six different institutional contexts. The eight questions were open-ended, allowed for written response and had the following focal points: 1) organizational structure; 2) personality and leadership styles in adopting institutions; 3) sequence of events in the adoption process; 4) personality and leadership style of change agent; 5) nature and type of communications used; 6) sequencing of action interventions; 7) level of usage of modules and other instruments; and 8) description of prospective teachers. The six different institutional contexts for these questions were: ideal situations, marginally acceptable situations and clearly unacceptable situations for the two separate cases of a) module-adopting institutions, and b) institutions adopting a psychological assessment battery with a counseling orientation.

For example, the questions in area 1 (Organizational Structure) for an ideal module-adopting institution were:

1. What organizational structure should exist?
   a. Draw an organizational hierarchy.
   b. Identify key positions.
   c. Define exactly what characteristics would be found in a "professionally mature" organization.

A change agent at The University of Texas Research and Development Center was asked to respond to the TSQ in as much detail as possible. His written responses were then shortened, checked for repetitiveness and synthesized. These responses were then typed into the questionnaire and used to give subsequent change agents a set upon which to base their responses. Since the questionnaire required an average of five hours to complete and the questions were open-ended, it was necessary to supply some structure in the form of another change agent's responses. An additional advantage to including a change agent's responses on the questionnaire was that these responses in their rewritten and synthesized form encouraged subsequent change agents to make their own responses as succinct as possible. An example of one of the eight question areas with the rewritten response of The University of Texas change agent to the question concerning organizational structure, is as follows:

(1) Only small group of adopters necessary.
(2) Department chairman strongly supportive with public statements, promotion rewards, providing resources.
(3) Dean's support helpful but not necessary for an individual module.

Five other change agents were invited to The University of Texas R&D Center and responded to the TSQ. In addition to being given the questionnaire with a change agent's responses, they also received two charts: one for module-

adopting institutions and one for institutions adopting a psychological assessment battery with a counseling orientation. Each of these charts plotted the focal points of the eight questions on the left hand margin against ideal, marginal, and clearly unacceptable situations in the columns. The charts enabled the change agents to get a quick view of the overall conceptualization of the questionnaire. The change agents' responses were then rewritten and synthesized. All change agents reported that the questions adequately probed the organizational variables to which a change agent responds when he approaches an institution and that the recorded responses on the questionnaire aided them in recalling information. The change agents did not feel that the recorded responses presented a limiting psychological set. The rewritten responses of all six change agents were then revised and fitted into the format of a checklist (TSC).

The responses of all change agents were then synthesized to make them as succinct as possible without losing descriptive information. They were also sorted into natural groupings within each question area. In addition the eight question areas were restated as information areas. The initial draft of the TSC (Checklist) form thus consisted of listings of rewritten responses, placed in natural groupings, under the appropriate information areas and institutional contexts.

It was then decided that three of these information areas (sequence of events in the adoption process, sequencing of action interventions, and personality and leadership style of change agent) would be more effectively used as guidelines and listed predictions of event sequences, than as a part of the checklist. These sections were later placed at the end of the final version of

the TSC manual.

The five remaining information areas, then, were: 1) organizational structure; 2) personality and leadership styles in adopting institutions; 3) nature and type of communications used; 4) level of usage of modules and other instruments; and, 5) description of prospective teachers.

The naturally occurring groupings under each information area were then combined into the uniform subdivisions which are listed in the Theoretical Framework section of this paper. All items were then placed under the appropriate uniform subdivision. The result was that the uniform subdivisions did not contain an equal number of ideal, marginal and unacceptable items. Consequently, items were generated on a logical basis until the number of items under each subdivision of the five information areas were equal for the ideal, marginal, and unacceptable institutional cases. If, for example, under the information area of organization structure for module-adopting institutions, and the subdivision social-professional climate of the organization, there were eight items under the ideal situation, eight items under the unacceptable situation, and six under the marginally acceptable situation, it was necessary to generate two items for the marginally acceptable situation in order to equalize the number of items occurring within the subdivision of social-professional climate. These two items were written in such a way that they would represent approximations of mid-points between the ideal and unacceptable items already recorded.

After the item numbers were equalized for each subdivision within the ideal, marginal and unacceptable situations, the items were assigned score values of 2, 1, and 0, respectively. The ideal, marginal and unacceptable items within

each subdivision were then combined randomly. For example, the eight items under the subdivision "social-professional climate" in each of the ideal, marginal and unacceptable situations, were randomly grouped within one subdivision (by the same title), giving that subdivision a total of twenty-four items. This was done for all subgroups under each of the five information areas.

Such a procedure was followed for the development of both the TSC-A and the TSC-B. In cases where the information collected from the six change agents for the TSC-B was less extensive than for the TSC-A, it was necessary to take some items directly from the TSC-A in order to equalize the items on the TSC-B. The items which were selected in this manner did not contain references to modules and were related to situations which would be applicable to both module-adopting institutions and institutions adopting assessment batteries with a counseling orientation. Examples of two subscales, one for the TSC-A and one for the TSC-B, are attached at the end of the paper.

Data Source

The six change agents mentioned above were the data source upon which the TSC was built. Although their anonymity has been guaranteed, their backgrounds can be briefly described. Change agent number one: has worked in two teacher training institutions which had adopted innovations similar to those described by the TSC. (One institution was remote and rural and the second was a large, mid-western university.) Change agent number two: was asked by the college administration of a small rural teacher training institution to organize a new teacher training program, brought people with him and attracted generous govern-

ment funding. Change agent number three: had several years of experience in a major state university which had field tested innovations similar to those described by TSC, and was brought in by the faculty and administration of a small state teacher training institution to install a competency-based teacher education program. Change agent number four: was a member of a resource agency team involved in the dissemination of educational innovations and has had experiences in a variety of higher education institutions. Change agent number five: worked as an internal change agent along with change agent number two at the same setting and has had more recent experience as an external change agent. Change agent number six: has had both national and international experiences as a change agent and has worked in training institutions, local school districts, and institutions of higher learning.

Concluding Remarks

Hopefully, The "Trouble Shooting" Checklist represents the first stages of development of an instrument which can guide an inexperienced, as well as an experienced change agent through an organizational maze. Without such an instrument, a change agent would need considerable experience to recognize institutions which had not developed to the point where innovations could be integrated into their programs. The TSC offers the potential of being a systematic short cut to many painful years of trial and error experience. On the other hand, an experienced change agent could use the TSC to quickly organize the cues to which he instinctively responds.

Examples of Items from the TSC-A

Organization Structure Scale

CHECK ONLY THE 8 ITEMS THAT MOST APPLY

Category B: Social-Professional Climate of the Organization

_____ 1. The institution may be committed to another innovation already developed or has no need for the change agent's innovation.

_____ 2. There is a group leader in the organization who is cognizant of group dynamic techniques and can work effectively with the group.

_____ 3. The institution as a whole has respect for its education department, but there is little interaction between the education department and the rest of the university.

_____ 4. The institution has ample resources upon which to draw for the adoption of innovations.

_____ 5. The institution is liberal arts oriented with a bias against education.

_____ 6. This institution emphasizes publication, independent investigation, and training of doctoral students.

_____ 7. Although the faculty have enough professional security to risk failure, their personalities are such that they would not take great risks.

_____ 8. Individual members within the organization are able to reinforce one another.

_____ 9. The institution as a whole has respect for its education department and draws regularly on its resources.

_____ 10. There is much emphasis placed on an overly literal interpretation of "democracy," which may result in paralysis of the innovation process.

_____ 11. There is an organizational inertia at this institution.

____ 12. There is much concern with the status quo and little reward for innovation.

____ 13. Although individual members of the department are on good terms, they are not in a position to reinforce each other.

____ 14. The institution definitely rewards innovation.

____ 15. There is much interest in the techniques involved in the use of the innovation, but limited concern with its impact on the students.

____ 16. Although the institution is not isolated, it still is not yet fully integrated into the community.

____ 17. There is an emphasis on the development of students and a concern about the impact of an innovation on the education of students.

____ 18. The institution is small and isolated.

____ 19. The institution is an integral part of the community.

____ 20. There is an atmosphere of professional security, and the adopters feel that they are able to risk failure.

____ 21. There are very conservative constituents and consumers at this institution.

____ 22. The resources which can be used for the adoption of innovations are limited.

____ 23. Although innovation is sometimes encouraged, no clear-cut rewards for innovating are apparent.

____ 24. The institution may be prestige oriented.

☐ CATEGORY I-B SCALE SCORE

Examples of Items from the TSC-B

Organization Structure Scale

CHECK ONLY THE 5 ITEMS THAT MOST APPLY.

Category C: Characteristics of the Counselors

____ 1. The counselors are grouped with student services organizations and are overly conscious of legal responsibilities associated with confidential files.

____ 2. The counselors are anti-measurement.

____ 3. Although the majority of the counselors are supportive of the program adoption, there are a few who still have serious reservations.

____ 4. Counselors have faculty appointments and are respected as equal members of the department.

____ 5. The counselors have both a humanistic orientation and a respect for the value of psychological measurement.

____ 6. The counselors are encouraged by one or two curriculum and instruction faculty members.

____ 7. Counselors are not on the faculty and have other concerns.

____ 8. The orientation of the counselors is not clear and is so diffused that any unified effort will be difficult.

____ 9. Some counselors have faculty appointments, but others do not. As a result, their concerns are not all focused in the same direction.

____ 10. Counseling psychologists have a behavioral orientation, and their actions reflect this viewpoint.

____ 11. The counselors are interested in the innovation, but have not yet taken action.

____ 12. Counseling psychologists are supportive of the program adoption.

____ 13. Some of the counselors have their doubts about the value of psychological measurement but are willing to go along with the other counselors who are more supportive of the program.

____ 14. The institution has counseling psychologists who are in philosophical agreement with the counseling orientation of the psychological assessment battery.

____ 15. There are counselors with strong disagreements about the philosophical assumptions underlying the innovation.

☐ CATEGORY I-C SCALE SCORE

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